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09/614,785	07/12/2000	Dong-Il Cho	00656	2551

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EXAMINER

HASSANZADEH, PARVIZ

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 12/10/2001

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/614,785

Applicant(s)

CHO, DONG-IL

Examiner

Parviz Hassanzadeh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 July 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 July 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other:  |

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities: on page 4, line 10, it is suggested to change "Figs. 2 and 3" to "Figs. 2a-2d and 3a-3d".

Appropriate correction is required.

### ***Drawings***

The drawings are objected to because in Fig. 1, "loading pump" should be changed to "loading chamber 11"; "expansion pump" should be changed to "expansion chamber 12"; and "etching pump" should be changed to "etching chamber 13". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "13" has been used to designate both "etching chamber" and "electrical feed through" in Fig. 1. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

regards as the invention. In claim 1, line 5, it is suggested to specify if the "means for injecting nitrogen" is injecting nitrogen to the loading chamber, the expansion chamber, the etching chamber or a selected combination thereof.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

**Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Patel et al (US Patent No. 6,290,864 B1).**

Patel et al teach a silicon etching apparatus using  $\text{XeF}_2$ , the apparatus comprising:

a source chamber 11 containing  $\text{XeF}_2$  (*a loading chamber for loading  $\text{XeF}_2$* ), an *expansion chamber* 12 for receiving  $\text{XeF}_2$  gas from the source chamber 11, and an *etching chamber* 14 for performing an etching process on a sample; and

a first gas source 16 and a second gas source 18 (*a means for injecting nitrogen*) in communication with the expansion chamber 12 for preparing a gas mixture with a ratio about 1:1 to about 500:1 to achieve greater etching selectivity and wherein the non-etchant gas source can be nitrogen (column 6, lines 10 through column 7, line 14; column 8, lines 50-67; and Table in column 8).

**Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by McQuarrie et al (JP 10-317169 A).**

McQuarrie et al teach a silicon etching apparatus (Fig. 1) using  $\text{XeF}_2$ , the apparatus comprising:

a source room 16 containing  $\text{XeF}_2$  (*a loading chamber for loading  $\text{XeF}_2$* ), a tank 18 (*an expansion chamber*) for collecting  $\text{XeF}_2$  gas from the source room 16, and an *etching chamber* 11 for performing an etching process on a wafer; and

an inactive (inert) support gas supply section 15 (*a means for injecting nitrogen*) that mixes with the etching gas before entering the etching chamber 11 (abstract and paragraphs 0001-0010).

The apparatus also including a showerhead as shown in Fig. 1 for uniform distribution of the etchant gas (*an injector having a predefined shape provided in the etching chamber*); and a pressure sources 21 and 22 which are in communication with the source room 16 and tank 18 via a series of valves (*means for feedback controlling the internal pressure of the loading chamber*) in order to maintain a constant pressure within the source room 16 and the tank 18 (paragraph 0011).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over McQuarrie et al (JP 10-317169 A) in view of Sinha et al (US Patent No. 6,123,765).**

McQuarrie et al teach all limitations of the claim as discussed above except for a means for measuring the weight of  $\text{XeF}_2$  in the loading chamber.

Sinha et al teach deposition apparatus including a gas delivery system 10 wherein a weight scale 24 is used to monitor the weight of the liquid chemical in a bubbler chamber 13.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the weight scale as taught by Sinha et al in the apparatus of McQuarrie et al in order to monitor the weight of the xenon difluoride in the load chamber.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Imai et al (US Patent No. 5,716,494) teach an etching apparatus including a gas distribution injector; Chen et al (US Patent No. 4,478,677), Winter (US Patent No. 4,190,488) and Matsui et al (JP 61-134019 A) disclose conventional silicon etching apparatus using xenon difluoride; and Nakagi et al (JP10-209088 A) and Matsui

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et al (JP 61-181131 A) disclose silicon etching apparatus wherein an inert carrier gas such as nitrogen is used to carry an etchant  $\text{XeF}_2$  gas to an etching chamber..

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Parviz Hassanzadeh  
Examiner  
Art Unit 1763

p. h.  
December 5, 2001

GREGORY MILLS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700